Electronic Supplementary Material (ESI) for Materials Advances.

Electronic Supplementary Information

Band Gap Tuning of Photo Fenton-like Fe_3O_4/C Catalyst through Oxygen Vacancies for Advanced Visible Light Photocatalysis

Muthaimanoj Periyasamy,[1,2] Sumanta Sain,[3] Utsav Sengupta[1], Moumi Mandal[1], Sudipta Mukhopadhyay[2]* and Arik Kar,[1]*

[1]*Department of Chemistry, Indian Institute of Engineering Science and Technology, Shibpur, Howrah 711 103, India*

[2]*Department of Mining Engineering, Indian Institute of Engineering Science and Technology, Shibpur, Howrah 711 103, India*

[3]*School of Materials Sciences, Indian Association for the Cultivation of Science, Jadavpur, Kolkata 700 032, India*

*Author to whom correspondence should be addressed; electronic mail: akar@chem.iiests.ac.in; Tel.: +0091 8334845357

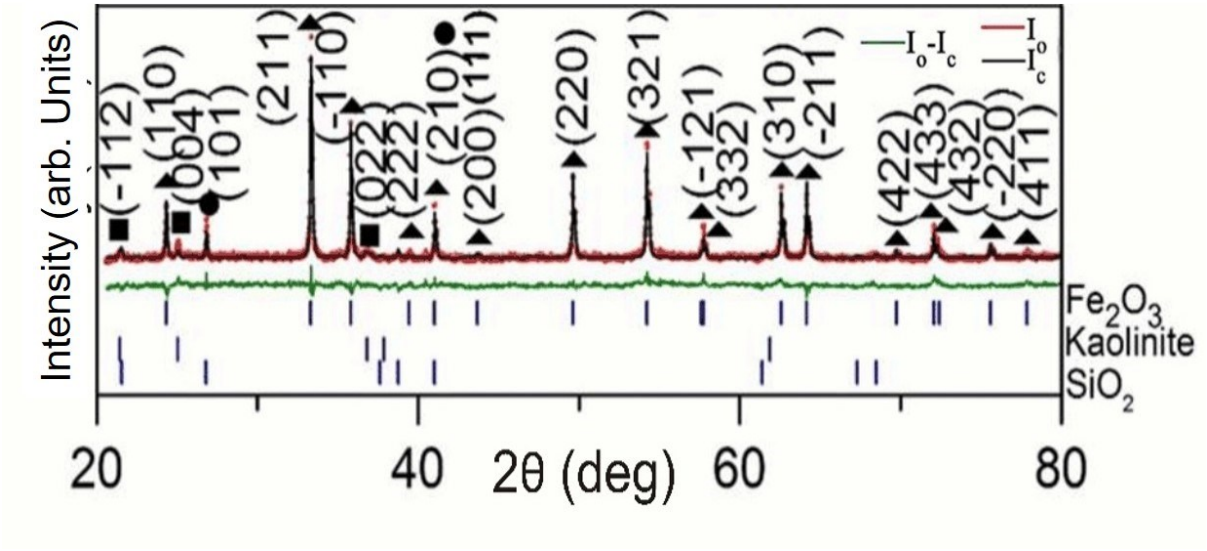


Figure S1 Indexed experimental and simulated XRD patterns of IOTs (Red, black, and green patterns represent observed (I_O), computed (I_C), and residue (I_O-I_C) data respectively. Blue markers (|) below each fitted pattern represent peak positions of the constituent phases. (▲), (■), and (●) represent Fe_2O_3, kaolinite and SiO_2 phases respectively.

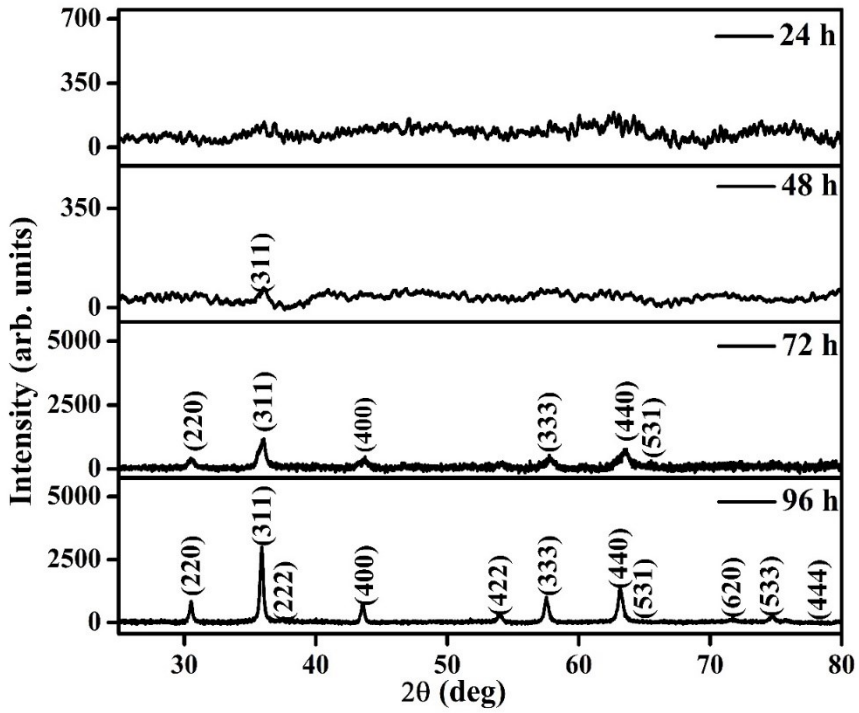


Figure S2 XRD patterns of nanoparticles synthesized with different reaction times (24,48,72 and 96 h) at 160 ^{0}C.

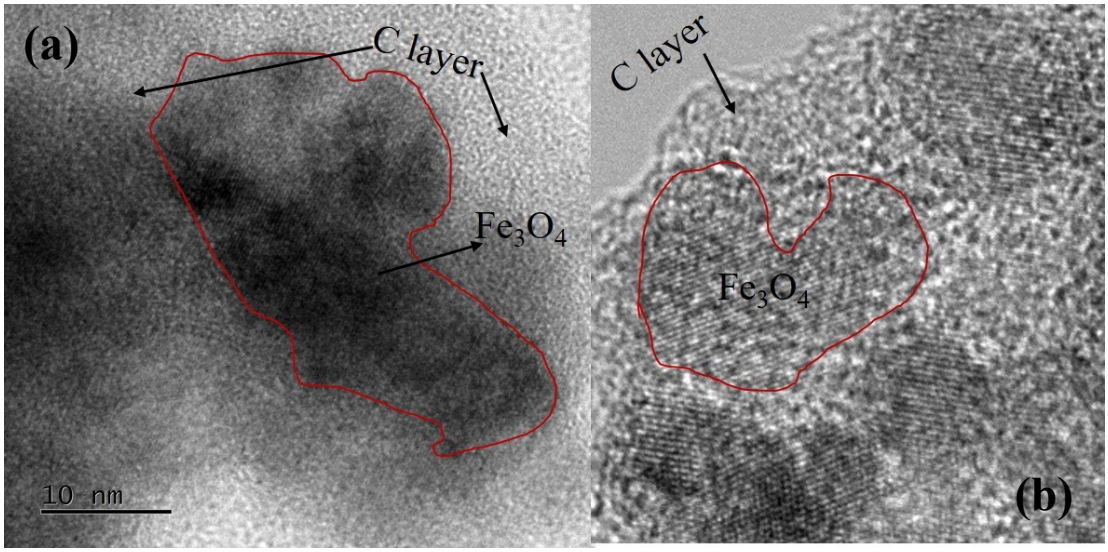
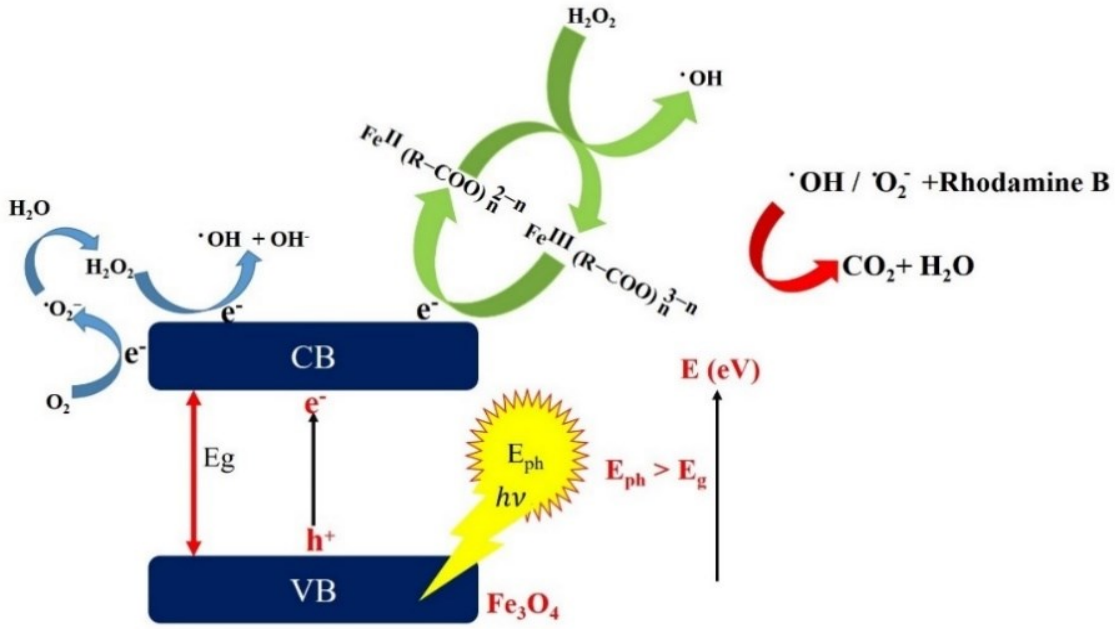


Figure S3 HRTEM images of Fe_3O_4/C nanocomposites for (a) M_1 and (b) M_2.



Scheme S1 Schematic showing the photocatalytic decolourization of RhB dye by Fe_3O_4/C nanocomposites.

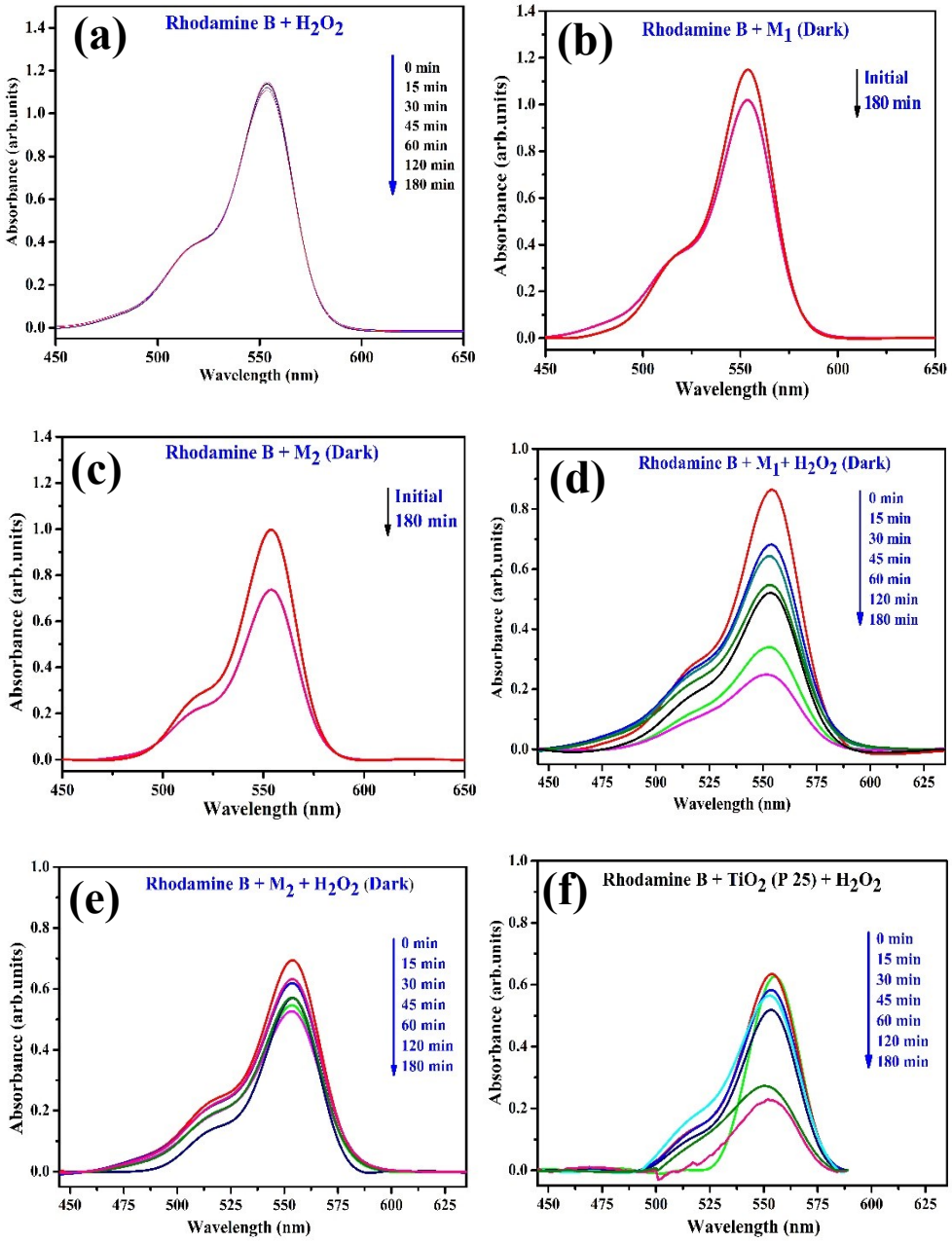


Figure S4 Changes to Λ_{max} (555 nm) to RhB dye (50 ml of 1.0×10^{-5} M aqueous solution) upon treatment (a) with only H_2O_2 (100 µl) under irradiation (b) with M_1 (25.0 mg) without irradiation and in absence of H_2O_2 (c) with M_2 (25.0 mg) without irradiation and in absence of H_2O_2 (d) with M_1 (25.0 mg) without irradiation and in presence of H_2O_2 (100 µl) (e) with M_2 (25.0 mg) without irradiation and in presence of H_2O_2 (100 µl); (f) Photolytically induced changes to λ_{max} (555 nm) for RhB dye (50 ml of a 1.0×10^{-5} M aqueous solution) on treatment with TiO_2 NPs (Degussa 25, 25.0 mg) and H_2O_2 (100 µl) under visible light irradiation.